

WHAT IS CLAIMED IS:

- 1 1. A method comprising
2 driving an amplifier in a predefined manner,
3 sensing a change in power delivered to a power input of the amplifier as a result of the
4 predefined driving, and
5 determining a value indicative of a state of connection of one or more speakers to an
6 output of the amplifier, based on the sensed change in power.
- 1 2. The method of claim 1 in which sensing the change in power comprises sensing a change
2 in power delivered to a power input of an apparatus that includes the amplifier as a result of
3 the predefined driving.
- 1 3. The method of claim 1 in which sensing the change in power comprises sensing a change
2 in power transmitted from a power supply supplying the amplifier as a result of the
3 predefined driving.
- 1 4. The method of claim 1 in which sensing the change in power comprises measuring a
2 current.
- 1 5. The method of claim 1 in which determining the value comprises
2 comparing the sensed change to a plurality of stored changes, each stored change
3 corresponding to possible states of connection of the one or more speakers; and
4 selecting a stored change closest to the sensed change.

- 1 6. The method of claim 1 in which driving the amplifier in a predefined manner comprises
2 applying a driving signal of known frequency and amplitude to the amplifier.
- 1 7. The method of claim 1 in which driving the amplifier in a predefined manner comprises
2 applying a driving signal with characteristics which prevent the amplifier output from
3 causing an audible effect.
- 1 8. The method of claim 1 in which determining a value comprises determining an
2 impedance seen at the output of the amplifier.
- 1 9. The method of claim 1 also including
2 comparing the determined value to an expected value for the one or more speakers.
- 1 10. The method of claim 9 in which the expected value comprises an impedance of the one or
2 more speakers.
- 1 11. The method of claim 10 in which the expected value comprises an impedance of the one
2 or more speakers operating at a frequency of a signal driving the amplifier.
- 1 12. The method of claim 1 in which the state of connection includes two speakers connected
2 to the output of the amplifier.
- 1 13. The method of claim 1 in which driving the amplifier in a predefined manner comprises
2 applying at least one probing signal.

1 14. The method of claim 13 in which two speakers are connected to the channel and more
2 than one probing signal is used to drive the amplifier.

1 15. The method of claim 13 in which the probing signal is selected to be outside a normal
2 range of hearing.

1 16. The method of claim 13 in which the probing signal is a single pulse comprising a shape
2 that is selected to minimize an audible effect of energizing a drive coil of a DC-connected
3 speaker.

1 17. The method of claim 1 in which the change comprises an input supply current change of
2 the amplifier.

1 18. The method of claim 1 in which determining the value comprises performing noise
2 rejection.

1 19. The method of claim 18 in which performing noise rejection comprises performing noise
2 rejection using synchronized demodulation.

1 20. The method of claim 18 in which performing noise rejection comprises performing noise
2 rejection using correlation analysis.

1 21. A system comprising
2 an amplifier having a speaker output, a drive signal input, and a power input, and
3 a circuit connected to determine whether and which speaker or speakers are connected to
4 the speaker output based on a detected amount of power being drawn at the power input.

- 1 22. The system of claim 21 also including
2 a current supply electrically connected to the power input of the amplifier.
- 1 23. The system of claim 22 in which the circuit comprises an inductor across which a voltage
2 measurement can be made, the inductor being electrically connected between the current
3 supply and the power input of the amplifier.
- 1 24. The system of claim 23 in which the inductor comprises a low resistance portion and a
2 low inductance portion.
- 1 25. The system of claim 22 in which the circuit comprises a resistive circuit board trace with
2 two points between which a voltage drop can be measured, the resistive circuit board trace
3 being electrically connected between the current supply and the power input of the amplifier.
- 1 26. The system of claim 21 in which the circuit comprises a signal measurement module.
- 1 27. The system of claim 21 in which the circuit detects the amount of power being drawn at
2 the power input of the amplifier by sensing an amount of power transmitted from a power
3 supply electrically connected to the power input of the amplifier.
- 1 28. The system of claim 21 comprising:
2 an apparatus including the amplifier,
3 wherein the circuit detects the amount of power being drawn at the power input of the
4 amplifier by sensing an amount of power drawn at a power input of the apparatus.

1 29. The system of claim 28 wherein the amplifier is a first amplifier, the system comprising:
2 a second amplifier that is included in the apparatus, the first and second amplifiers each
3 having one or more speaker outputs and being capable of being driven independently,
4 wherein the circuit is configured to sense an amount of power drawn at a power input of
5 the apparatus while driving each amplifier independently, making it possible to diagnose
6 output faults each output channel of each amplifier using the sensed power at the apparatus.

1 30. A computer program product, tangibly embodied in an information carrier, for detecting
2 connectivity of a speaker, the computer program product comprising instructions operable to
3 cause data processing apparatus to:
4 drive a channel of an amplifier with at least one probing signal;
5 receive a measurement signal indicative of a change to an input supply signal of the
6 amplifier;
7 calculate a predefined quantity based on the measurement signal; and
8 compare the determined predefined quantity to an expected value.

1 31. The computer program product of claim 30, wherein the instructions are further operable
2 to cause the data processing apparatus to define a predetermined frequency for the probing
3 signal.

1 32. The computer program product of claim 31, wherein the instructions are further operable
2 to cause the data processing apparatus to define the expected value using an impedance of the
3 speaker operating at the predetermined frequency.

- 1 33. The computer program product of claim 31, wherein the instructions are further operable
- 2 to cause the data processing apparatus to define the expected value using an impedance of a
- 3 first speaker and a second speaker operating at the predetermined frequency, the first and the
- 4 second speakers being electrically connected to the channel.